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METHODS TO ASSESS SELENIUM EXPOSURE: EVALUATION OF DIETARY INTAKE AND BIOMARKERS IN MELANOMA PATIENTS AND POPULATION CONTROLS

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BACKGROUND

Selenium is a metalloid of strong nutritional and toxicological importance, whose relation with risk of chronic diseases, including cancer, is still uncertain and currently under active investigation. Different methods to estimate selenium exposure in the human have been suggested but their strengths and limitations are still controversial. We assessed selenium status in a group of melanoma patients and population controls, by evaluating their average dietary intake of the metalloid and its concentrations in plasma and toenails.

METHODS

We investigated selenium status of 54 patients with newly-diagnosed cutaneous melanoma and 56 controls, originally enrolled in a population-based case-control study of environmental and life-style risk factors of cutaneous melanoma in Modena, northern Italy. We sampled subjects' blood and toenails and we administered a food frequency questionnaire including 248 questions on frequency and quantity of consumption of 188 food items, developed within the EPIC (European Prospective Investigation on Cancer and Nutrition) project in northern Italy. Plasma and toenail selenium concentrations were determined by atomic absorption spectrometry with Zeeman background correction and neutron activation analysis, respectively.

RESULTS

In the overall study population, plasma selenium levels correlated with toenail concentrations (Spearman rank correlation coefficient ρ=0.22, *P*=0.02), but these biomarkers were not associated with dietary intake of the metalloid. In subgroup analysis according to disease status, plasma selenium levels were associated with dietary intake only among cases (ρ=0.25, *P*=0.07), while plasma and toenail concentrations correlated both in cases and in controls.

Figure 1.
EPIC Food Frequency Questionnaire for the assessment of selenium intake.

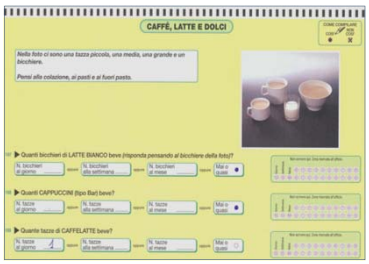


Figure 2.
Zeeman-corrected atomic adsorption spectrometer for plasma selenium determination (a) following microwave-assisted closed vessel acid digestion (b).

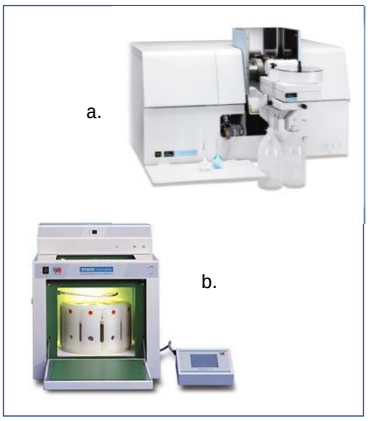
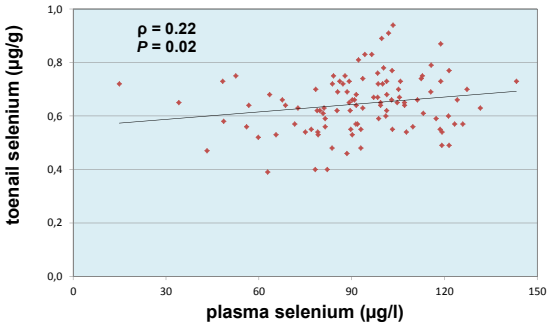


Table 1.
Mean values (± SD) of plasma, toenails and dietary selenium.

	All n 110	Cases n 54	Controls n 56
Plasma selenium (µg/l)	92.77 (21.49)	99.85 (18.94)	85.94 (21.75)
Toenail selenium (µg/g)	0.645 (0.107)	0.638 (0.104)	0.652 (0.109)
Dietary selenium (µg/die)	59.28 (21.18)	59.17 (22.88)	59.38 (19.71)

Figure 3.
Relation between plasma and toenails selenium (Spearman correlation analysis).



DISCUSSION

Study results may be explained by intake of different selenium species in cases compared with controls, or more likely by differences in absorption and metabolism of selenium compounds between the two study groups. These findings suggest that the validity of methods assessing selenium exposure may vary according to disease status.

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